

IHNC LOCK REPLACEMENT STUDY
ECONOMICS APPENDIX

SECTION 1 - DESCRIPTION OF PROJECT SETTING.....	E-1
SECTION 2 - EXISTING, HISTORICAL AND PROJECT TRAFFIC.....	E-5
<u>EXISTING AND HISTORICAL SHALLOW-DRAFT TRAFFIC.....</u>	E-5
IHNC LOCK TRAFFIC AND FLOW PATTERNS.....	E-5
SYSTEM TRAFFIC AND FLOW PATTERNS.....	E-18
<u>EXISTING AND HISTORICAL DEEP-DRAFT TRAFFIC.....</u>	E-23
SYSTEM TRAFFIC.....	E-23
IHNC LOCK TRAFFIC.....	E-33
<u>PROJECTED SHALLOW-DRAFT TRAFFIC.....</u>	E-38
OVERVIEW.....	E-38
PROJECTIONS OF COAL TRAFFIC.....	E-41
Background.....	E-41
Future Coal Demand.....	E-43
Projections of Coal Traffic Through IHNC Lock.....	E-46
PROJECTIONS OF CRUDE PETROLEUM.....	E-52
Background.....	E-52
a. GIWW - Mobile to New Orleans.....	E-52
b. GIWW - Mississippi River to Sabine.....	E-52
Projections of Crude Petroleum Traffic.....	E-52
a. Crude Traffic Not Common with IHNC.....	E-52
b. Crude Traffic Through IHNC.....	E-53
c. System Traffic for Crude Petroleum.....	E-53
PROJECTIONS OF PETROLEUM PRODUCTS TRAFFIC.....	E-55
Background.....	E-55
Projections of Petroleum Products Traffic.....	E-55
PROJECTIONS OF OTHER COMMODITY GROUPS.....	E-57
Background.....	E-57
Projections of Other Commodity Groups.....	E-61
PROJECTIONS OF COMBINED TONNAGE.....	E-65
<u>PROJECTED DEEP-DRAFT TRAFFIC.....</u>	E-75
OVERVIEW.....	E-75
SCENARIO DESCRIPTION.....	E-77
PROJECTED UNCONSTRAINED LOCKAGE DEMAND.....	E-80
SECTION 3 - SYSTEMS ANALYSIS.....	E-86
<u>INTRODUCTION.....</u>	E-86

GENERAL EQUILIBRIUM MODEL RATIONALE AND METHODOLOGY.....E-86

<u>DATA REQUIREMENTS AND SOURCES</u>	E-92
COMMODITY MOVEMENT DATA BASE.....	E-92
Commodity Volumes and Alt Routings.....	E-92
a. Transportation Cost Analysis.....	E-92
b. Reconciliation of LPMS and WCSC.....	E-92
c. Alternative System Routes and Movement File Aggregation.....	E-96
d. Future Traffic Levels.....	E-100

CONGESTION COSTS.....	E-101
LOCK CAPACITY AND DELAY ANALYSIS.....	E-104

SECTION 4 - TRANSPORTATION RATE ANALYSIS.....E-105

<u>DEVELOPMENT OF THE RATE SAMPLE</u>	E-105
---	-------

<u>TRANSPORTATION RATE ANALYSIS</u>	E-106
ROUTING OPTIONS.....	E-106
ASSUMPTIONS.....	E-108
METHODS AND PROCEDURES.....	E-108
Barge Rates.....	E-110
Rail Rates.....	E-111
Truck Rates.....	E-112
Pipeline Rates.....	E-112
Handling Charges.....	E-112
Loading and Unloading Charges.....	E-112

<u>EXPANDING THE RATE SAMPLE TO THE POPULATION</u>	E-113
ASSIGNMENT PROCESS.....	E-113
SUMMARY OF RESULTS.....	E-119

<u>WITH-PROJECT SAVINGS ADJUSTMENT</u>	E-122
--	-------

SECTION 5 - LOCK CAPACITY AND DELAY FUNCTION ESTIMATION...E-125

<u>OVERVIEW</u>	E-125
-----------------------	-------

<u>DETERMINISTIC APPROACH</u>	E-125
-------------------------------------	-------

<u>SIMULATION APPROACH</u>	E-129
SIMULATION SETTING	E-129
MODEL STRUCTURE	E-131
Entities	E-131
Components	E-132
a. Preamble	E-132
b. Events	E-132
c. Routines	E-133
MODEL INPUTS	E-133
Timing Data	E-134
a. Bridge Interference	E-134
b. Lockage Components	E-135
Traffic Data	E-140
Sample Input File	E-142
MODEL OUTPUT	E-149
DELAY FUNCTION CALCULATION	E-149
MODEL RESULTS	E-153
 <u>SECTION 6 - WITHOUT-PROJECT CONDITION</u>	E-162
 <u>OVERVIEW</u>	E-162
 <u>DESCRIPTION</u>	E-162
 <u>SECTION 7 - SHALLOW-DRAFT SYSTEMS ANALYSIS</u>	E-166
 <u>OVERVIEW</u>	E-166
 <u>WITHOUT-PROJECT CONDITIONS</u>	E-166
 <u>WITH-PROJECT CONDITIONS</u>	E-166
 <u>SECTION 8 - DEEP-DRAFT ANALYSIS</u>	E-189
 <u>OVERVIEW</u>	E-189
 <u>INTRA-HARBOR LOCKAGES</u>	E-189
 <u>THRU LOCKAGES</u>	E-190
 <u>EXCLUSION OF LIQUID BULK</u>	E-190
 <u>UNCONSTRAINED LOCKAGE DEMAND</u>	E-191
 <u>UNCONSTRAINED FUTURE LOCKAGE DEMAND</u>	E-197

<u>LARGEST VESSEL ACCOMMODATED BY ALTERNATIVE</u>	E-197
<u>ESTIMATED LOCKAGES AND BENEFIT DETERMINATION</u>	E-204
SECTION 9 - VEHICULAR TRAFFIC ANALYSIS	E-224
<u>VEHICULAR TRAFFIC MODEL</u>	E-224
OVERVIEW.....	E-224
DEFINITIONS.....	E-224
QUEUEING METHODOLOGY.....	E-225
Period Definition.....	E-227
Navigation Independent Costs.....	E-228
Navigation Dependent Costs.....	E-236
DIFFERENTIAL RUNNING SPEED APPROACH.....	E-242
Cost Calculation Procedure.....	E-242
SELECTION OF METHODS.....	E-243
<u>MODEL RESULTS</u>	E-246
WITHOUT-PROJECT CONDITIONS.....	E-246
Costs for Diverted Traffic.....	E-251
WITH-PROJECT CONDITIONS.....	E-251
SECTION 10 - PROJECT COSTS, SUMMARY OF BENEFITS, AND ECONOMIC JUSTIFICATION	E-258
<u>PROJECT COSTS</u>	E-258
FIRST COSTS.....	E-258
OM&R COSTS.....	E-258
AVERAGE ANNUAL COSTS.....	E-262
<u>BENEFIT PRICE LEVEL UPDATING</u>	E-262
OVERVIEW.....	E-262
SHALLOW-DRAFT.....	E-262
DEEP-DRAFT.....	E-264
VEHICULAR.....	E-266
OTHER.....	E-266
<u>SUMMARY OF BENEFITS</u>	E-266
<u>ECONOMIC JUSTIFICATION</u>	E-269
SECTION 11 - SENSITIVITY ANALYSIS	E-272

<u>OVERVIEW</u>	E-272
<u>ALTERNATIVE TRAFFIC GROWTH</u>	E-272
LOW	E-272
HIGH	E-278
NO GROWTH AFTER 20 YEARS (i.e., Year 2010)	E-279
SOUTH AMERICAN COAL IMPORTS	E-286
<u>TIMING</u>	E-291
PHASED CONSTRUCTION	E-291
DELAYED IMPLEMENTATION	E-303
<u>INTEREST RATE</u>	E-305
<u>ALTERNATIVE FLOOR/SILL ELEVATIONS</u>	E-305